OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Secondary Education

MATHEMATICS B (MEI)   **1968/2313A**
PAPER 1 SECTION A
HIGHER TIER

Monday   **5 JUNE 2006**   Afternoon   45 minutes

Candidates answer on the question paper.
Additional materials:
    Geometrical instruments
    Tracing paper (optional)

	Candidate Name		Centre Number	Candidate Number

TIME   45 minutes

INSTRUCTIONS TO CANDIDATES

*   Write your name, Centre number and candidate number in the boxes above.
*   Answer **all** the questions.
*   Write your answers, in blue or black ink, in the spaces provided on the question paper.
*   Read each question carefully and make sure you know what you have to do before starting your answer.
*   Show all your working. Marks may be given for working which shows that you know how to solve the problem, even if you get the answer wrong.

INFORMATION FOR CANDIDATES

*   The number of marks is given in brackets [ ] at the end of each question or part question.
*   The total number of marks for this section is 36.

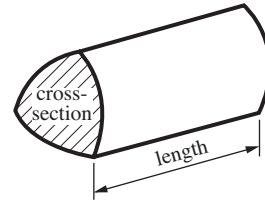☒ **WARNING**

You are not allowed to use a calculator in Section A of this paper.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages.

Formulae Sheet: Higher Tier

Volume of prism = (area of cross-section) × length
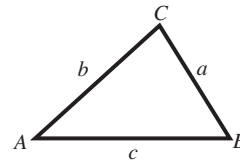
In any triangle *ABC*

Sine rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

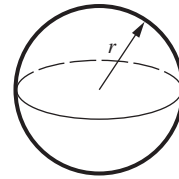**Cosine rule** $a^2 = b^2 + c^2 - 2bc \cos A$

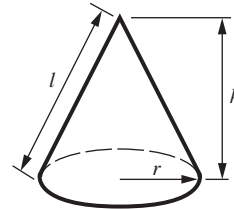**Area of triangle** = $\frac{1}{2} ab \sin C$

Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$

Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

1   Make *t* the subject of this formula.

$$v = u + at$$

....[2]

2   The goal area of a hockey pitch is in the shape of a semicircle with diameter 30 m.

30 m
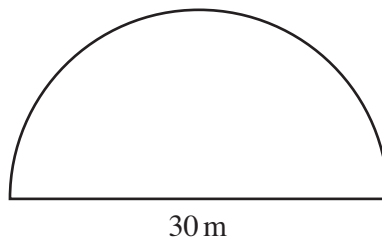
(a) Calculate the total perimeter of the goal area.
Take π to be 3.

(a) ....m [3]

(b) Show that the area of the goal area can be written as $112.5\,\pi\,\text{m}^2$.   [2]

[Turn over

3 Work out.

$$6\tfrac{2}{3} - 2\tfrac{4}{5}$$

....[3]

4 **(a)** Write 40 as the product of its prime factors.

(a) ....[2]

(b) Find the least common multiple (LCM) of 30 and 18.

(b) ....[2]

5 Solve this inequality.

$$6x > 8 - 4x$$

....[2]

6 In this question, *h* and *w* represent lengths.

Does the expression $\frac{1}{6}\pi hw^2$ represent a perimeter, an area, a volume or none of these?

Give a reason for your answer.

.... because ....

....[2]

[Turn over

7 **(a)** Factorise.

$$x^2 - 25$$

(a) ....[1]

(b) Simplify.

$$\frac{x^2 - 25}{2x^2 + 5x - 25}$$

(b) ....[3]

(c) Solve.

$$\frac{2x^2 - 21}{x} = 11$$

(c) ....[4]

8 **(a)** Show that $\left(\sqrt{48} + \sqrt{3}\right)^2$ is an integer. [3]

(b) Evaluate $25^{-\frac{3}{2}}$.

(b) ....[2]

TURN OVER FOR QUESTION 9

9 (a) Find b and c such that $(3x + b)^2 + c \equiv 9x^2 + 12x - 7$.

(a) $b =$ ....

$c =$ ....[3]

(b) The sketch shows the graph of $y = 9x^2 + 12x - 7$.

Using your answer to part (a), state the coordinates of the lowest point on the graph.

(b) (.............. , ...) [2]